PCH PhysicoChemical Hydrodynamics

The International Journal

Volume 8 1987

Chairman Editorial Advisory Board (1980–1987)
Benjamin G Levich
Editor-in-Chief
D Brian Spalding
London
USA Editor
Ronald F Probstein

Pergamon Press

Oxford · New York · Beijing · Frankfurt · São Paulo · Sidney
Tokyo · Toronto

PCH PhysicoChemical Hydrodynamics

Editor-in-Chief
D. Brian Spalding
Bakery House, 40 High Street,
Wimbledon, London SW19 5AU, England.

U.S.A. Editor
Ronald F. Probstein
Department of Mechanical Engineering,
Massachusetts Institute of Technology,
Cambridge, MA 02139, U.S.A.

Associate Editors

R. P. Borghi, Laboratoire de Thermodynamique, Université de Rouen et De Haute Normandie, 76130 Mont Saint Aignan, France.

H. Brenner, Massachusetts Institute of Technology, Chemical Engineering Department, Cambridge, MA 02139, U.S.A.

J. M. Delhaye, Centre d'Etudes Nucleaires de Grenoble, Service d'Etudes Thermohydrauliques, 85X 38041 Grenoble, Cedex, France.

T. J. Hanratty, University of Illinois at Urbana, 205 Roger Adams Laboratory, Urbana, IL 61801, U.S.A.

J. A. C. Humphrey, Division of Fluid Mechanics and Thermodynamics, Department of Mechanical Engineering, The University of Liverpool, P.O. Box 147, Liverpool L69 3BX, U.K.

D. T. Hurle, Royal Signals and Radar Establishment, St Andrews Road, Malvern, Worcs, U.K.

E. Jakeman, Royal Signals and Radar Establishment, St Andrews Road, Malvern, Worcs, U.K.

N. C. Markatos, School of Mathematics, Statistics and Computing, Thames Polytechnic, Wellington Street, London SE18 6PF, U.K.

A. Pollard, Department of Mechanical Engineering, McLaughlin Hall, Queen's University, Kingston, Ontario, K7L 3NL, Canada.

X B Reed Jr.,University of Missouri—Rolla, School of Engineering, 143 Chemical Engineering Building, Rolla, MO 65401, U.S.A.

W. Rodi, Institut für Hydromechanik, Universität Karlsruhe, Kaiserstrasse 12, D-75 Karlsruhe 1, F.R.G.

D. A. Saville, Princeton University, Chemical Engineering Department, Princeton, NJ 08540, U.S.A.

A. B. Strong, University of Waterloo, Mechanical Engineering Department, Waterloo, Ontario, N2L 3G1, Canada.

Editorial Advisory Board

E. Barendrecht, Eindhoven University of Technology, The Netherlands.
T. A. Brzustowski, University of Waterloo, Canada.
M. Combarnous, Université de Bordeaux I, France.
J. T. Davies, University of Birmingham, England.
F. Durst, Friedrich-Alexander Universität, Erlangen, F.R.G.
M. Fleischmann, University of Southampton, England.
P. G. de Gennes, Collège de France, Paris, France.
R. Goulard, George Washington University, Washington D.C., U.S.A.
U. Grigull, Technische Universität München, F.R.G.
J. S. Langer, University of California, Santa Barbara, U.S.A.
L. Napolitano, University of Naples, Italy.
S. Ostrach, Case Western Reserve University, Ohio, U.S.A.
I. Prigogine, Université Libre de Bruxelles, Belgium.
P. D. Richardson, Brown University, U.S.A.
R. Shinnar, City College, New York, U.S.A.
S. Sideman, Technion—Israel Institute of Technology, Israel.
A. Silberberg, Weizmann Institute of Science, Israel.
C.-L. Tien, University of California, Berkeley, U.S.A.
H. L. Toor, Carnegie Mellon University, U.S.A.
M. G. Velarde, UNED, Spain.
G. Wranglen, Royal Institute of Technology, Sweden.

Publishing, Subscription and Advertising Offices

Pergamon Journals Ltd., Headington Hill Hall, Oxford OX3 0BW, England.

Pergamon Journals Inc., Maxwell House, Fairview Park, Elmsford, NY 10523, U.S.A.

Volumes 8 and 9 (8 issues) to be published in 1987.

Annual Subscription Rates 1988

Annual institutional subscription rates (1988) including postage and insurance: DM 585.00. 2 year institutional rate (1988/89): DM 1111.50. Personal subscription rate for those whose library subscribes at the regular rate (1988): DM 176.00. Prices are subject to change without notice.

Subscription enquiries from customers in North America should be sent to: Pergamon Journals Inc., Maxwell House, Fairview Park, Elmsford, NY 10523, U.S.A., and for the remainder of the world to: Pergamon Journals Ltd., Headington Hill Hall, Oxford OX3 0BW, U.K.

Copyright © 1987 Pergamon Journals Ltd.

Microform Subscriptions and Back Issues

Back issues of all previously published volumes are available in the regular editions and on microfilm and microfiche. Current subscriptions are available on microfiche simultaneously with the paper edition and on microfilm on completion of the annual index at the end of the subscription year.
It is a condition of publication that manuscripts submitted to this journal have not been published and will not be simultaneously submitted or published elsewhere. By submitting a manuscript, the authors agree that the copyright for their article is transferred to the publisher if and when the article is accepted for publication. However, assignment of copyright is not required from authors who work for organisations which do not permit such assignment. The copyright covers the exclusive rights to reproduce and distribute the article, including reprints, photographic reproductions, microform or any other reproductions of similar nature and translations. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, electrostatic, magnetic tape, mechanical, photocopying, recording or otherwise, without permission in writing from the copyright holder.

U.S. Copyright Law Applicable to Users in the U.S.A.

Photocopying information for users in the U.S.A. The Item-fee Code for this publication indicates that authorization to photocopy items for internal or personal use is granted by the copyright holder for libraries and other users registered with the Copyright Clearance Center (CCC) Transactional Reporting Service provided the stated fee for copying, beyond that permitted by Section 107 or 108 of the United States Copyright Law, is paid. The appropriate remittance of $3.00 per copy per article is paid directly to the Copyright Clearance Center Inc., 27 Congress Street, Salem, MA 01970.

Permission for other use. The copyright owner's consent does not extend to copying for general distribution, for promotion, for creating new works, or for resale. Specific written permission must be obtained from the publisher for such copying.

The Item-fee Code for this publication is: 0191-9059/87 $3.00 + 0.00.

VOLUME CONTENTS

Volume 8 Number 1

SPECIAL ISSUE ON "TURBULENCE"

C. H. Gibson	1	Oceanic turbulence: big bangs and continuous creation
A. A. Townsend	23	Organized eddy structures in turbulent flows
H.-T. Yao and C. A. Petty	31	The effect of turbulent retardation on physico-chemical absorption
M. C. Roco and C. A. Shook	43	New approach to predict concentration distribution in fine particle slurry flows
X. B. Reed, Jr. and D. W. Heineck	61	Fully developed self-preserving turbulence in a thin crossed shear layer
J. J. Jost and X. B. Reed, Jr.	77	Transport of passive additives across a fully developed self-preserving crossed turbulent shear layer
Diary Section	91	
Announcement	94	

Volume 8 Number 2

A. D. Surridge and D. Hayton	95	The operation of a natural-draught dry-cooling system under stable atmospheric conditions
K. A. Pericleous and M. K. Patel	105	The modelling of tangential and axial agitators in chemical reactors
R. A. Antonia, L. W. B. Browne and L. Fulachier	125	Spectra of velocity and temperature fluctuations in the intermittent region of a turbulent wake
J.-F. Thovert and P. M. Adler	137	Transport processes in fractals—V. Conductivity and permeability of random Leibniz packings
T. Dabroś and T. G. M. van de Ven	161	Deposition of latex particles on glass surfaces in an impinging jet
D. Villers and J. K. Platten	173	Separation of Marangoni convection from gravitational convection in Earth experiments
R. E. Hinkley, M. M. Dias and A. C. Payatakes	185	On the motion of oil ganglia in porous media
J. L. Marié	213	A simple analytical formulation for microbubble drag reduction

G. D. Stubley, A. B. Strong, W. E. Hale and D. R. Absolom	221	A review of mathematical models for the prediction of blood cell adhesion
Diary Section	239	
Announcement	I	
Notes for Contributors	III	

Volume 8 Number 3

L. Shemer and D. Barnea	243	Visualization of the instantaneous velocity profiles in gas–liquid slug flow
T. C. Ransohoff and C. J. Radke	255	Weeping flow around nonwetting bubbles trapped in constricted noncircular pores
S. S. Ibrahim, R. W. Bilger and N. R. Mudford	265	Calculation of mixing and chemical reaction in a turbulent smog chamber
E. Chervenivanova and Z. Zapryanov	293	On the deformation of a fluid particle moving radially inside a spherical container
A. F. A. Hoadley	307	The effect of a solid-phase transition on solidification experiments
G. Camera-Roda, F. Santarelli and M. Bertelà	311	Mixed convection and radiative heat exchange in a radiant energy collecting system
M. Weinstein	325	On the capillary instability of a rotating liquid jet disintegrating in a vacuum
N. Ashgriz and S. C. Yao	335	Combustion studies in fuel rich idealized sprays
G. Gouesbet	349	New presentation of experimental results for overstability phenomena produced by a hot-wire located near and below a free surface
Book Reviews	353	
Announcement	355	
Diary Section	357	
Notes for Contributors	I	

Volume 8 Number 4

H. Benticha and M. A. Dudeck	361	Asymptotic analysis of cylindrical laminar premixed flame
H. Vogt	373	The instability problem of the bubble street in vertical interelectrode gaps
A. Rais, H.-C. Gay and R. Moreliere	383	A three dimensional transient model developed to simulate by computer the scanned electron-beam annealing of ion implanted silicon
M. Vignes-Adler, P. M. Adler and P. Gougat	401	Transport processes along fractals. The Cantor–Taylor brush
A. Rey de Luna, M. C. Lemos, A. Córdoba and M. Zamora	423	Discontinuous transition and hysteresis in a fluid layer with a temperature-dependent viscosity
S. Viala and B. Simon	433	Influence of hydrodynamics on the crystallization of gypsum on a metal surface
A. P. Shorygin and Yu. V. Tolkachyov	443	Processes in electrochemical slit-cells with non-symmetric and symmetric multielectrode systems
P. O. Brunn	449	Some modern developments in the flow of dilute polymer and surfactant solutions
Book Reviews		
D. B. Spalding	461	Transport processes in chemically reacting flow systems, by D. E. Rosner
A. A. Wragg	461	Journal of Chemical Industry and Engineering (China)
Announcements	463	International Symposium on Surface Interactions
	463	Second International Symposium on Two-Phase Annular and Dispersed Flows
Diary Section	464	
Title Section, Volume Contents and Author Index	i	
Notes for Contributors	ix	